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INSECTS IN RELATION
TO
NATIONAL DEFENSE

Circular 17

STABLE FLIES



May 1941

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INTRODUCTION

The stable fly, or dog fly (Stomoxys calcitrans L.), is widely distributed in various parts of the world. It is a vicious blood sucker, the bite of which produces severe pain.

This fly has been shown to be capable of carrying a number of diseases of livestock, such as anthrax, surra, and swamp fever, and one experiment indicated that it can carry infantile paralysis.

The most important role of the fly, however, is annoyance of man and animals. When present in outbreak numbers, as is not infrequent in the grain belt and along the East Coast, especially in western Florida, it may kill horses and cattle by continuous worry and loss of blood, drive people away from the beaches, and prevent effective performance of activities in all places where they are exposed to free attack. Under such conditions it is difficult to control horses, and their condition and work efficiency are materially lowered. Production of dairy herds is often decreased from 5 to 25 percent, and the ears and other parts of dogs and hogs are made raw by the flies' numerous punctures.

DISTRIBUTION

As indicated in the introduction, the stable fly is widely distributed. It is present in all parts of the United States, Mexico, and the West Indies. It is usually most troublesome in the grain belt from north Texas to North Dakota and Minnesota. It is also extremely abundant along the coast of the Gulf of Mexico from Pensacola to Carrabelle, Florida. Severe local outbreaks may occur in any part of the country where conditions are favorable for it to breed.

BREEDING PLACES

Stable flies breed in fermenting vegetable matter of many kinds. Manure, especially horse manure mixed with straw or other bedding material, is a common breeding place. Straw stacks which

become wet soon after threshing have been known to produce hordes of these flies. Oat straw, especially when mixed with grain and chaff, is very favorable as a breeding place. Corn husks, corn cobs, hay, and other materials wasted around feed racks and wet by manure, urine, and rain produce large numbers of flies. Lawn clippings and accumulations of weeds piled up and allowed to ferment are also suitable breeding places for this fly. Weeds, grass, and other debris washed up by heavy rains or by floods may also become infested.

Along the coast, especially on the shores of bays in western Florida, drifts of marine grasses, when washed high on the beaches where they are not frequently reached by tides, have been found to breed large numbers of these flies. It appears that these windrows of grasses are responsible for the serious outbreaks of the stable, or dog, fly in that region. This insect has also been found to develop in great numbers in peanut litter left in fields after peanuts have been threshed. There is some indication that part of the trouble on the beaches may be due to these inland breeding places.

DESCRIPTION OF STAGES AND LIFE CYCLE

The stable fly resembles the common housefly. It is slightly more robust and has a strong piercing beak which can be seen projecting forward beneath the head when the fly is at rest, Fig. 1. The elongate, whitish eggs are laid in loose masses on fermenting vegetable matter. These hatch in 1 to 3 days into minute whitish maggots that feed on the moist material usually near the surface.

They attain full size, Fig. 2, about $\frac{4}{5}$ of an inch in length, in 7 to 30 days, or even



Figure 1 - The stable fly.

longer in cold weather. The maggot changes into the pupa, or resting stage, in the breeding material or in the soil nearby. The pupa is yellowish at first, later changing to dark brown or nearly black. In form it is somewhat barrel-shaped, as is usual with flies of this family, Fig. 3. This stage lasts about 6 to 20 days. The fly pushes the head end of the hard pupa case open and crawls out. It

soon spreads its wings and after its body hardens, it is ready to fly and seek an animal

upon which to feed.

Eggs are not laid for 3 or 4 days after emergence. The life cycle may be completed in 18 days, but it usu-

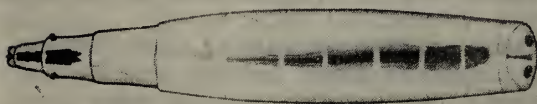


Figure 2 - Larva, or maggot.

ally requires 21 days and may take three months during cool weather.

HABITS

Biting and Egg Laying

Both sexes of the stable fly are blood suckers. The flies have a strong tendency to bite on the lower parts of the legs of both man and animals. On horses and cattle the outside of the forelegs is preferred, but when numerous the flies attack any part of the animal, especially the shoulders, sides, and neck.

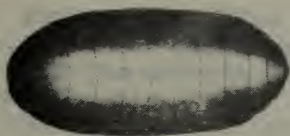


Figure 3 - Pupa.

The flies insert their beaks very quickly after alighting and they are ready to fly away quickly when disturbed. They may become fully fed in 2 to 5 minutes when not disturbed. Usually, however, they are disturbed and make many punctures and perhaps bite several different animals or people before they are satisfied. This repeated attack on a number of different animals or people would appear to favor the transmission of disease. Considerable blood is drawn; frequently the flies become so full of blood they can scarcely fly, Fig. 4. When fed they fly to nearby buildings, fences, or trees, and there rest while digesting their meal.

Usually the flies feed on blood every day or even twice a day during hot weather. They also suck up moisture from the breeding material or from leaves. In cold weather they may not bite for several days. When it warms up they are especially vicious. During the life of a fly, from 3 to 5 masses of eggs ranging from a few to more than 100 are deposited

with one or more blood meals interspersed.

Horses and cattle are preferred over man as hosts, but large animals of all kinds are attacked, and cold-blooded animals may occasionally be bitten.

Flight

The stable fly is a swift and strong flier. The species has been observed to follow animals for considerable distances, mak-

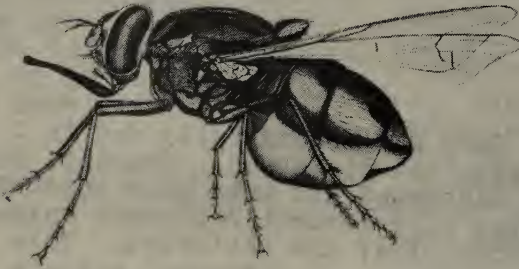


Figure 4 - Adult female, engorged with blood.

ing repeated efforts to bite. There is evidence that this fly may travel long distances as it has been observed to appear in numbers on boats many miles off shore. "Marked" flies have been recaptured 52 miles from point of release.

Hibernation

In cold climates the stable fly passes the winter in the larval or pupal stages, development usually proceeding slowly. In the warmer parts of the world breeding is continu-

ous the year around. In the Southern States flies continue to emerge during warm periods in winter. Ordinarily these flies die without laying eggs, but those which do not emerge until favorable temperatures occur in spring deposit eggs and breeding continues.

CONTROL

The elimination of breeding places is of paramount importance in controlling the stable fly. Many of the control procedures recommended for the housefly (Circular No. 8) are of value in combating the stable fly.

Prevention of Breeding

Breeding of the stable fly may be prevented largely by proper handling of manure, straw, peanut litter, grass clippings, and other vegetable matter that may ferment. Since this fly breeds in a large variety of farm wastes, most of which are beyond the jurisdiction of the defense agency that may be adversely affected by the fly, cooperation of farmers and other civilian populations in the area must be secured.

Straw should be well stacked as grain is threshed so as to prevent the rains from soaking deeply into it, or the straw should be baled at once and stored in a dry place. The butts of straw stacks should be scattered thinly on fields. This is particularly true of the chaff and light grain mixed with it. As stable flies may breed in shocked grain exposed to rain for considerable periods, prompt threshing is desirable.

In general, the treatments given below for infested materials are effective in preventing initial infestations.

Treatment of Infested Material

Manure.--Prompt scattering on fields or rick-ing and composting of manure, as described for the control of the housefly (Circular 8) is recommended when large quantities must be cared for. The use of manure pits and of borax (Circular 8) is applicable to stable fly control in smaller lots of manure held for fertilizing purposes.

Manure, hay, and other vegetable materials scattered around feed racks must be cleaned up every 3 or 4 days and treated as above if fly breeding therein is to be prevented.

Sludge, either while floating on sewage disposal tanks or being dried on sludge beds, may breed great numbers of stable flies if not treated. The floating material should be submerged mechanically and the sludge on drying beds either sprinkled with borax or scattered thinly so as to hasten drying.

Straw.--When straw stacks have become thoroughly wet by heavy rains soon after threshing and fly breeding is taking place in them, it is advisable to burn them at once if the straw is not urgently needed for other purposes. Scattering the straw thinly over fields with a straw spreader or by hand will check breeding.

Bay grasses.--The development of large quantities of these flies in windrows of bay grasses washed up on certain types of beaches along the Gulf Coast by tides and storms has

been discovered only recently. Measures for control under these conditions have not been fully developed or tested.

Preliminary control experiments indicate that applying a mixture of creosote oil, 1 part, and fuel oil No. 2, 3 parts, sprayed into the windrows of bay grasses with a power sprayer (Circular No. 22), using 300-pound pressure, has given promising results. This method of control is described in Circular E-541, "Control of Dog Fly Breeding in Beach Deposits of Marine Grasses" (see list of references), which will be supplied on request together with any new facts that are developed by studies now under way.

Other breeding materials.---Stable fly breeding in peanut litter, grass clippings, ensilage, and other wet fermenting vegetable materials is best controlled by scattering infested materials thinly on open fields. This method of control is described in Circular E-542, "Control of Dog Fly Breeding in Peanut Litter" (see list of references).

Fly Sprays

Stable flies are much more easily killed by pyrethrum-oil sprays (Circular 21) than are houseflies and most other insects. The main difficulty is to reach them with the spray, for, as previously stated, they are present on livestock a short time and rest most of the time on objects away from their hosts.

Spraying livestock lightly with pyrethrum concentrates containing 5 to 10 parts of the concentrate to 1 part of light, highly refined oil (see Circular 21) kills the flies

hit by the spray. When thus used the poisonous effect of the pyrethrum persists on the hair for several hours and stuns or kills the flies that attempt to feed. Pyrethrum oil spray of the usual strength (1 to 1) is effective in killing the flies which may be found in mess halls, barns, or other buildings.

No material has been found that is highly effective in repelling stable flies from livestock or people for any length of time.

Traps

Ordinary conical fly traps (see Circular 20) catch very few stable flies because these flies are not strongly attracted to baits.

Hodge traps, Fig. 5, set in windows of barns in which livestock is kept catch considerable numbers of these insects as they attempt to enter or leave the barn. They are most effective if the buildings are fairly tight and the windows not provided with traps are darkened with burlap or other material.

Electric grids (see Circular 20) set in windows in the same way also kill considerable numbers of these flies.

Traps, however, are only minor supplements to the treatment of breeding places.

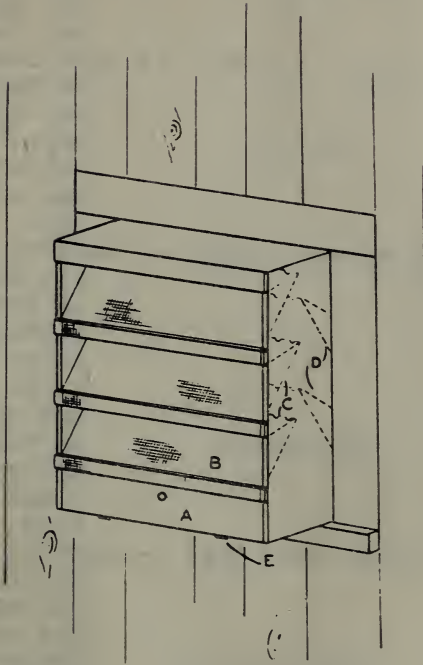


Figure 5 - Hodge trap in window of barn: A. door for removing dead flies; B. screen bent into V-shaped folds and provided with quarter-inch holes C. along apex to catch flies trying to enter barn; D. folds on opposite side to admit flies trying to leave barn; E. hinges on door.

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